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ABSTRACT

Shakespeare's genius as a creative playwright can be judged both subjectively and objectively. Cognitive psychology uses specific behavioral measures to assess performance. A product is marked by latency, quantity, and quality. When college students engage in tests of originality, these measures support many theories of creativity. A similar analysis applied to the plays of Shakespeare shows little support for any of the models. A closer look at the content of these plays gives some information about other aspects of creativity, such as novelty and relevance. For example, research has yielded some information on Shakespeare's mixing of emotions to enhance impact. Increased word-play relates to some increased popularity in the tragedies and a tendency toward decreased popularity in the comedies. A still more empirical analysis of content has been developed by C. Martindale. A preliminary application of his procedure has suggested some changes in content with time and some changes in popularity with content. For example, in all the plays the use of words that carry "primary process" connotations of sex, aggression, and the darker side of the human psyche decreased with date of publication. On the other hand, secondary process or cognitive material increased as Shakespeare matured. This content does not, however, relate directly to the contemporary popularity of the plays. Still, with these objective measures subjective hypotheses can be tested for a more complete picture of both Shakespeare and genius. (Three figures are included and 35 references are attached.) (Author)

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The Genius of Shakespeare: A Case History in Content Analysis

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Abstract

Shakespeare's genius as a creative playwright can be judged both subjectively and objectively. Cognitive psychology uses specific behavioral measures to assess performance. A product is marked by latency, quantity, and quality. When college students engage in tests of originality these measures support many theories of creativity. A similar analysis applied to the plays of Shakespeare shows little support for any of the models. A closer look at the content of these plays gives some information about other aspects of creativity, such as novelty and relevance. For example, research has yielded some information on Shakespeare's mixing of emotions to enhance impact. Increased word-play relates to some increased popularity in the tragedies and a tendency toward decreased popularity in the comedies. A still more empirical analysis of content has been developed by Martindale. A preliminary application of his procedure has suggested some changes in content with time and some changes in popularity with content. For example, in all the plays the use of words that carry "primary process" connotations of sex, aggression, and the darker side of the human psyche decreased with date of publication. On the other hand, secondary process or cognitive material increased as Shakespeare matured. This content does not, however, relate directly to the contemporary popularity of the plays. Still, with these objective measures subjective hypotheses can be tested for a more complete picture of both Shakespeare and genius.

The Genius of Shakespeare: A Case History in Content Analysis

To begin with, Shakespeare was a genius. His plays are still being performed and discussed 400 years after they were written. The impact of his stylistic and formal experiments has been profound and lasting. The nature of this genius has been examined, evaluated, and reconsidered with each new generation of literary scholars.

Consequently progress is defined more by extent than direction. In an effort to make some judgments about the source of Shakespeare's genius some empirical measures of its nature would be helpful. From the standpoint of experimental or cognitive psychology the measures of response latency and variability are the basic data. In evaluating theories of creativity, or at least divergent thinking, these measures are quantity and quality of output (Derks, 1987)

Cognition and Creativity

Different models of creativity make different statements about the course of quantity and quality in the production of ideas. Although something of an oversimplification these predictions give direction to a quest for the "nature" of creativity.

The focus of the classic associative theories was on the increased consistency of behavior (learning). Nevertheless, generalization of stimulus and response could give the organism flexibility. The failure of a response in a problem solving task could be remedied by shifting along some response hierarchy until something was tried that worked. Therefore, attempts to be creative would be characterized by early bursts of related ideas. The

likelihood of success or creativity should decrease as the generalization function moves out to the extremes. Although rather "old fashioned" such a position seems to receive contemporary support from Weisberg (1986).

The alternative classical model, and one more concerned with problem solving, was Gestalt theory. Generalization was not the mechanism of flexibility. Rather a "fixation" must be broken and "insight", a new perspective, obtained. Consequently, time should pass before responses are attempted. These early attempts will be less likely to succeed. Once the problem is solved, however, the game is over and few additional ideas will be ventured. A contemporary, perceptual view of creativity seems to be Perkins (1981).

A more modern conception of the origin of ideas is suggested by the network or computational models of cognition. Here connections between nodes of thought have more flexibility and greater extent. Once initiated, a search for a solution would continue on indefinitely at about the same rate. The solution, therefore, could be early, late, or anywhere in the course of the search. Furthermore, a solution would not terminate search so better ideas might occur on down the line. The writings of Anderson & Bower (1973) or Newell and Simon (1972) are not inconsistent with such a model. Cognitive psychology has not, however, given much attention to creativity. Still, the examination of expert performance has led to an analysis very like the associative model (Hunt, 1984).

Indeed, the supporters of a computational position may argue for a feedback mechanism in selecting solutions. This added assumption leads to

the evolutional models of creativity. "Poor" ideas would be extinguished and relatively successful ones would be carried on to contribute to future solutions. Here again the output of ideas should be fairly constant (if "weak" offspring are produced) but the quality of the "strong" alternatives should show progressive improvement. Campbell (1960) is credited with originating this notion but Martindale (1973, 1984) and Simonton (1988) have enriched it and given it extensive validation. Most recently Penrose (1989) has added his version which gives the feedback mechanism a perceptual, unconscious (Gestalt?) quality.

Insert Figure 1 about here

If college students are asked to do some variant of a divergent thinking task the results look like Fig.1. In this instance students made up "funny" captions to still pictures from old movies. The solid line is captions per minute per student (quantity). The rate falls with time but even after ten minutes and about eight captions these typical and unselected students were coming up with about two captions every three minutes. The associative model blends into the network model. The dotted line is the location of captions chosen as "best" by their originator corrected for total output during that minute (quality). Quality shows a decline during the associative part of the process, an increase during networking, "insight" during the eighth minute, all in all support for any model one chooses. In terms of significance, however, the perturbations in the quality function are

unreliable thus supporting, by default, the prediction of the network model. More careful analysis of similar data does reveal the best caption is usually created after the worst occurs (Derks, 1988).

Such research does not, of course, "divorce genius from talent, talent from mediocrity". Instead "if we are to discover....characteristics of genius-level creators...we must make minds of unquestioned distinction the center of our scientific attention." (Simonton, 1984, p. 43) Or, as James (1902 p.3) said, "the full significance" of a subject "must always look to its more completely evolved and perfect forms."

Insert Figure 2 about here

If Shakespeare is examined for quantity and quality of output something like Fig. 2 results. Quantity is based on the best estimates of dates of play composition calculated by Simonton (1986, 1987). Quality or "popularity" was also estimated by Simonton and is based on "impact measures". These citation estimates included frequency of performance, appearance in anthologies, recording, films, etc.

Quantity in two year periods shows a general decline. There was a remarkable rebound in 1607-08 that violates the associative model. The rebound is not marked by a jump in quality. Instead, quality reaches a peak with Lear and MacBeth in the same two year period. Perhaps Shakespeare received tenure in 1601 as quantity dropped off but quality climbed. Of course, this peak in quality also corresponds to the "age-40 floruit" observed

in so many creators. Simonton (1984) models this as two step function. The first involves the conversion of creative potential into creative ideations, something of an evolutional process. Then the ideas are elaborated. The elaborations are necessarily progressive departures from the best ideas, kind of an associative process.

The apparent negative relation between quantity and quality exist ($r(10) = -.284$) but is not significant. Anyway, Hamlet, far and away the highest impact play was written among Troilus and Cressida and All's Well That Ends Well, not Shakespeare's most popular. At least, Hamlet did follow the three parts of Henry VI, the lowest rated plays. Still, Timon of Athens follows Hamlet and is close to the Henry VIs' lack of impact. In short, Shakespeare's career shows some general trends, but specific departures from those trends make a simple interpretation untenable.

Consequently an important facet of Shakespeare's genius is revealed. His creations and their progression are multidimensional. He worked in history, comedy, tragedy, and developed the "romance", a kind of tragi-comedy making it uniquely his own.

Puns and Popularity

Indeed, it was his willingness and ability to mix the tragic and comic that dismayed his contemporaries and intrigues more modern audiences. "Gallimaufry" and "hodgepodge" were typical denunciations of his work. Nevertheless, later observers have found the mixture of "hornpipes and funerals" more lifelike and interesting (Levin, 1974).

In this mixing Shakespeare was anticipating and utilizing a very modern emotional phenomenon. One emotion can be enhanced by manipulating another. Sudden success is more appreciated in the context of greater effort. Arousal can be interpreted as pleasant or not depending on context. An opponent emotion (happy vs. sad) is activated when its counterpart is stimulated. (Apter, 1982; Schacter & Singer, 1962; Solomon, 1980).

Therefore, it might be predicted that the presence of comedy in a tragedy might increase its impact. Shakespeare is, of course, famous for his puns and word play. The relative frequency of such verbal antics would be an estimate of levity injected, to some extent, inappropriately in a play. Marino (1988) has argued that a pun, by it's very nature, is a distraction from the direct flow of discourse. Puns, then, could arouse an opponent emotion in tragedy and diffuse a relevant emotion in comedy. The frequency of irrelevant word play should have differential effects on tragedy and comedy (Derks, 1989). Colman (1974) has made a similar conjecture from the standpoint of literary criticism.

Unfortunately, Colman gives examples rather than counts. Even Partridge (1969/1948) in his famous Shakespeare's Bawdy presents his over 1200 examples in a glossary that does not lend itself to a per play analysis. There are, nevertheless, four counts of Shakespeare's puns that were done on a play by play basis.

Two of these were concerned with pure word play and not with any underlying target or "tendency" in the jest. Kokeritz (1953) was primarily

interested in pronunciation and examined jingles and homonyms for an indication of how the words were pronounced. Bather (1887) proposed that a decline in punning would be an indication of a more mature artist. Given such a puritan hypothesis his examples are appropriately sexless. McCall (1977) and Rubinstein (1984), on the other hand, have actively sought the sexual in William Shakespeare: Spacious in the possession of dirt and A dictionary of Shakespeare's sexual puns and their significance, respectively. Their broadened quest resulted in nearly 2000 entries compared with Bather at a little over 1000 and Kokeritz with over 500.

Although the pun frequency estimates all correlated significantly by play Bather and Kokeritz were in highest agreement at $r(35) = .852$ and McCall and Rubinstein were next with .649. Consequently there were differences in how well the various pun counts predict the popularity of different types of plays. (To increase the number of examples romances were judged as comedies because of their happy endings.)

Sexual punning did agree with popularity to some extent. For McCall increased sexual punning went with decreased popularity in comedies, $r(17) = -.44, p < .10$. Rubinstein's count correlated with increased popularity in the histories, $r(10) = .70$, $p < .01$.

Intellectual punning on the other hand, had a consistent effect on popularity. As hypothesized, increased punning increased tragedy impact, $r(10) = .41$ for Bather and .31 for Kokeritz. For comedies punning decreased impact, $r(17) = -.30$ for Bather and $r(17) = -.26$ for Kokeritz. The .71 difference in slope for Bather approaches significance, $z = 1.59$, $p = .056$. A

multiple regression analysis demonstrated that the most important factor in determining impact was whether a play was a tragedy or a comedy. Beyond that with puns per play as part of the equation 28.2% of the variance was described for Kokeritz, $F(5.31) = 2.44$, $p = .056$, and 32.4% for Bather, $F(5.31) = 2.97$, $p = .026$. This relationship is illustrated in Fig. 3.

Insert Figure 3 about here

Even though puns play a role in the popularity of Shakespeare's plays, Bather was right. The occurrence of intellectual puns in the plays decreases with date of composition, $r(35) = -.45$, $p<.01$ for Bather and $r(35)$ -.42, $p<.02$ for Kokeritz. The sexual puns, on the other hand, do not relate linearly to date. Shakespeare's sexuality is revealed in plays at every period.

There is also, however, a curvelinear function that follows time. In all four pun counts there is a tendency for a negative quadratic trend: Bather, --.25; Kokeritz, -.25; McCall, -.16; and Rubinstein, -.44. Only Rubinstein's quadratic component is significant, $p < .01$, but to say that Shakespeare simply punned less with maturity would not be an accurate representation.

Content and Genius

Although Shakespeare was a prolific puner, word play is a relatively small sample of his production. A more thorough analysis of the content of his writing should cast additional illumination (or shadow) on factors that contribute to his success.

The Regressive Imagery Dictionary (RID) of Martindale (1975) is an ideal tool for such further analysis. RID categorizes and counts the occurrences of words that relate to Freudian primary and secondary process. Briefly, primary process material has to do with sexual, aggressive, and emotional imagery while secondary process is related to intellect and control. Further combination of selected items yields an estimate of the difference in connotation between words that occur together. In some sense it estimates how far the metaphors in a writing are stretched. A relatively high score on "incongruous juxtapositions" would indicate that the author was building metaphors with distant connotations. A low score would indicate that the relations were typical and commonplace.

To some extent the measures of RID might be expected to parallel the pun counts. Puns, with a primary concern for sound over meaning, should yield a high score on incongruous juxtaposition. Sexual puns and terms would make a contribution to a count of primary process. Intellectual puns, on the other hand, would be more likely to occur in a context of secondary process.

Clearly none of this tells anything about how "good" the puns or metaphors might be. In general, the quality of a metaphor or a pun would be some U shaped function of the distance stretched for meaning (Marino, 1988; Pollio, Barlow, Fine, & Pollio, 1977). It can only be assumed that quality will be more likely to occur with quantity.

The text used for the analysis described here was a machine readable version of the first folio and a quarto version of Troilus and Cressida

(Howard-Hill, 1969). This was not entirely satisfactory as the English of the folio and the English of RID do not match perfectly. Still, Benjafield and Muckenheim (1989) have reported that the majority of the words in RID are dated by the Oxford English Dictionary well before the 16th century. Consequently, most of the words examined by RID should have been spelled the same in Shakespeare's time. Nevertheless, the uncorrected folio spellings must be seen as yielding estimates that are suggestive but tentative. (Oxford Press has recently released a PC disk version of Shakespeare in modern English. This version will be discussed latter in the paper.) Furthermore, the analysis was performed by Professor Martindale so the present discussion is second hand as well.

In general, Shakespeare showed a tendency to decrease in the two measures of primary process (-.223, p=.19 and -.348, p=.038) and increase secondary process (.483, p=.003). Neither of these factors, in and of themselves, correlated with contemporary popularity.

Still, with the pun information as a guide, there is evidence of some consistency. In tragedies intellectual puns correlated with increased popularity. A measure of incongruous juxtapositions also correlated with popularity, .507, p<.0001. Comedy, on the other hand, did not show the corresponding negative correlation. There was, however, a slight negative correlation between secondary process and comedic popularity (-.209 ,p=.08) Furthermore, the popularity of comedy correlated positively with the two measures of primary process, (.272, p=.025 and .285, p = .017). Simonton (1989) has found a similar result for the sonnets. In a sense the impact of

comedy and romance was best served if sex and aggression were not diluted by puns.

As for more specific semantic content, RID also counts for various categories in the semantic differential of Osgood (Osgood, Suci, & Tannenbaum, 1957) which serve as the basis for evaluating incongruous juxtaposition. Both activity and potency correlate negatively with the popularity of tragedies,(-.282, p = .029 and -.408, p<.001, respectively). At least the activity correlation may be a function of the occurrence of words like "death" and "die" on the passive side of the dimension. The more death the more impact in a tragedy. Indeed, activity correlates negatively with the popularity of all the plays taken together (-.385, p=.02). Furthermore, the weak side of the potency dimension is characterized by "fear, terror, tears, and pain", certainly appropriate for great tragedy.

Comedy, on the other hand, shows a positive correlation between potency and popularity, (.243, p = .043). Why "the strong, the hard, and the glorious" should contribute to humor is not clear. The definition of comedy, however, has to do with happy endings so the uplift of potency does seem more appropriate.

Of further interest in the analysis of Shakespeare's genius is his sensitivity to the use of content to increase greatness. Did the factors that contribute to the contemporary popularity of his plays change with his continued experience and maturity? Simonton (1986) found that the treatment of romantic, chivalric and courtly love as well as man as an object of ridicule increased then decreased. The linear and quadratic components

parallel the rise and fall of Shakespeare's contemporary impact. They also reflect a transition through youth to maturity. In general, however, "the care and government of children, the rights and duties of the child, parental despotism and tyranny" along with "madness or frenzy do to emotional excess" correspond to impact.

Perhaps the clearest statement of a concern for the impact of content comes from Shakespeare himself, as quoted by Archy the cockroach:

> any mutt can write
> plays for this london public
> says bill if he puts enough
> murder in them what they want
> is kings talking like kings
> never had sense enough to talk
> and stabbings and stranglings
> and fat men making love
> and clowns basting each
> other with clubs and cheap puns
> and off color allusions to all
> the smut of the day oh i know
> what the low brows want
> and i give it to them (Marquis, 1927, p. 104)

Clearly a statement for the impact of primary process.

The tragedies, then, are most popular with an average impact score of 50.08. They also show the most primary and secondary process as well as the

most incongruous juxtaposition. The advantage is, however, small over histories in primary process and over comedies in secondary process. Furthermore, the relative presence of primary and secondary process did not correlate with the popularity of the tragedies themselves. Finally, incongruous juxtapositions were not significantly different among all play types but did correlate with tragic popularity.

For the tragedies, as for the whole set of plays, measures of primary process decreased with time (-.463, p=.002 and -.424, p=.007) while secondary process increased (.260, p=.045). Incongruous juxtapositions did not show any consistent evidence of change. Therefore, in these more general measures of content, Shakespeare adjusted factors that did not have an effect on popularity and did not modify the one that did.

As for the connotative meaning, evaluative material drifted to the negative; the bad, diabolical, and anal,(-.364, p=.004) and potency, indicated by the strong, hard, and glorious, increased (.567, p<.0001). Shakespeare decreased the use of content in tragedies that has led to their increased popularity.

The comedies are next in impact, 47.21. They are least in secondary process. There was no progressive change in either primary or secondary process in spite of the significant role both factors play in the popularity of comedies. Evaluation moved to the bad with date of origin of the comedies, (-.505, p<.0001), although it was not an impact factor. Potency, on the other hand, moved to the strong with time (.523, p<.0001), corresponding to the positive effect on popularity.

Histories are the least popular, 30.60. Indeed the topic of "history of monarchy" is the kiss of death (Simonton, 1986) They are also lowest in secondary process. Given the importance of control in the histories this does not seem to fit. Furthermore they are near tragedies in primary process. Nevertheless, primary process went down with order (-.253, p.= 08 and -.457,p=.0009) and secondary process went up (.577, p<.0001). For the relatively unpopular histories none of these factors made a contribution.

Conclusions

Since the content analysis described here was preliminary and tentative any conclusions must be considered at the same level. Furthermore, given the number of comparisons made significance levels of .05 or even .01 cannot be taken as definitive. Nevertheless, since this is a measure of Shakespeare's plays and not a sample this measure is the way it is. Generality and reliability are not concerns.

A possible "replication" does await the analysis to be carried out on Oxford University Press' Shakespeare on Disk: The Complete Works. (Wells & Taylor,1989) Here the plays are presented in modern English. These have been obtained and are being prepared for RID. Unfortunately the "complete works", although including both a folio and a quarto version of King Lear, do not seem to include Henry VI parts 2 and 3. Furthermore, in backing up the disks, Richard II was inadvertently erased. When these problems, and those sure to come, have been solved a more reliable estimate of the RID content of Shakespeare's plays will be available.

Meanwhile what can be said about creativity and Shakespeare's genius? On the one hand, the conclusions are too obvious. Shakespeare was multidimensional in his work. His breadth and range of content and style show to a casual playgoer, a devoted scholar, or a computational examination. At least they all merge.

Somewhat more subtle is the combination of these dimensions. A significant aspect of creativity and genius is the combination of separate talents. At the subject level it is the mixing of tragedy and comedy. At the content level it is the mixing of primary and secondary process, especially in the tragedies.

Beyond this, however, is Shakespeare's independence. Admittedly he probably neither knew nor cared what scholars 400 years later would say about his work, but he also seemed unaffected by the concerns of his contemporaries. Perhaps, in another 400 years, the romances will be his most prized plays. Hamlet and Macbeth will be considered too direct and obvious. Winter's Tale and The Tempest will be his greatest works due to their combination of theme, plot, and style.

In any case, the judgement will not be totally subjective. The hypotheses to be tested will be based on an intelligent reading and evaluation of the text. Some empirical hacking will reveal sources of information. As with any scholarly endeavor, progress will depend on the interaction of rational theory and reliable observation. The hypotheses and the hacking will suggest where and how to look for the specific content to examine creativity and greatness.

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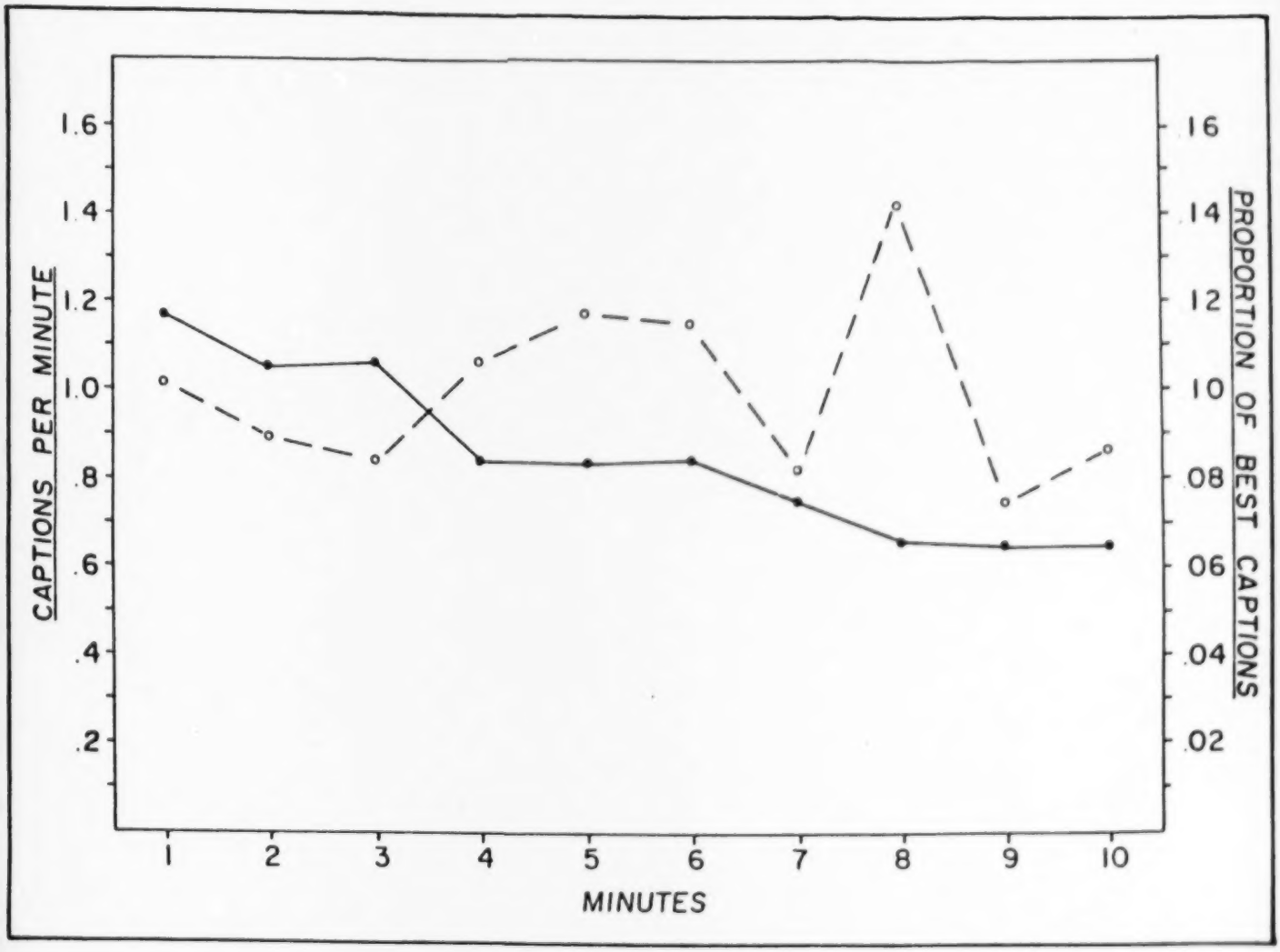
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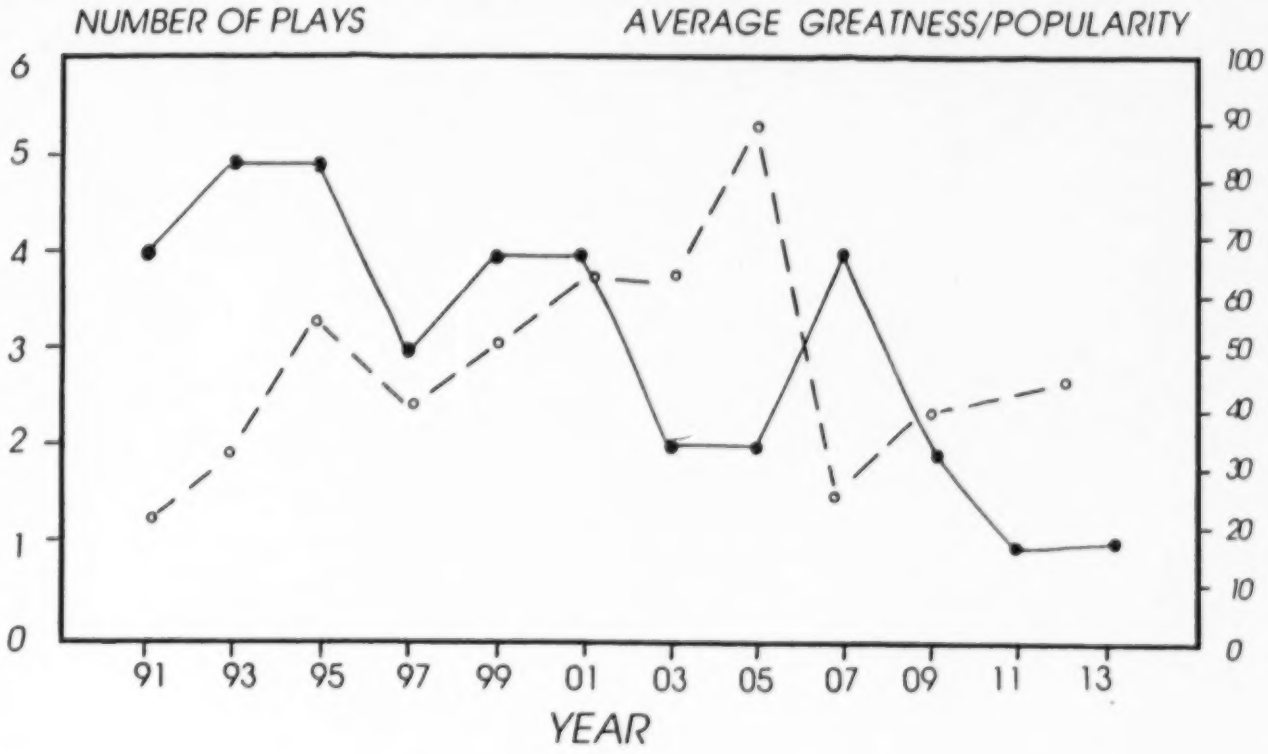

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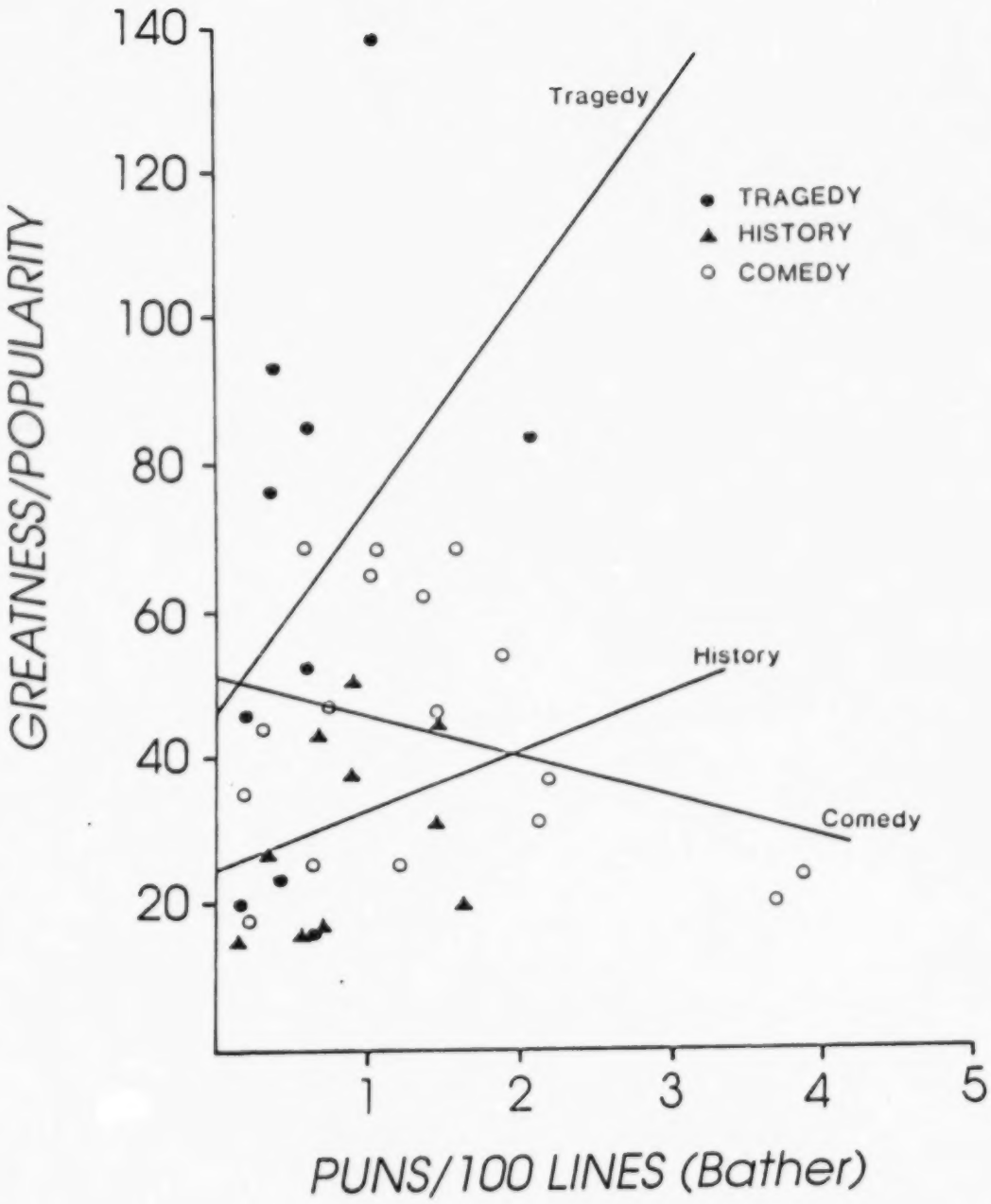
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